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Letter and Reply

Clinical usefulness of spot urine albumin-to-osmolality ratio for predicting 24-hour urinary albumin excretion

To the Editor:

We read with interest the article by Lee et al [1] that described the clinical usefulness of spot urine albumin-to-osmolality ratio (AOR) for predicting 24-hour urinary albumin excretion (AER) in patients with type 2 diabetes mellitus. Only a few studies on this issue have been reported using adult patients [2,3], but the authors, by utilizing Spearman's correlation and receiver operating characteristics (ROC) curves, were able to demonstrate comparable efficacy between AOR and the albumin-to-creatinine ratio (ACR) for determining microalbuminuria.

Lee et al reported urinary albumin excretion data [1], which were expressed as the mean $\pm$ standard deviation (SD) of AER, ACR, and AOR. Considering the very large SDs that were reported, many of the patients must have had macroalbuminuria. Thus, we doubt the authors enrolled appropriate patients according to their own inclusion criteria (e.g., excluding patients with proteinuria $\geq$ 500 mg/day). Instead of using means $\pm$ SDs, nonparametric methods (median: 25th–75th percentile) would be preferable for expressing data in these cases. Similarly, the ROC curves, which used a cut-off value of $\geq$ 30 mg/day as the definition of albuminuria, may not be appropriate for examining the diagnostic accuracy of spot urine AOR. The authors should have included patients without macroalbuminuria.

Correlations between 24-hour urine AER and spot urine ACR and AOR were presented in Table 2 [1]. Only the statistical results are shown, but figures illustrating the linear regression might be preferable in order to help readers understand their relationship more clearly.

Finally, we are concerned about the factors that affect urine osmolality when we use spot urine AOR to predict 24-hour urine AER. The hydration status of the patient and the degree of vasopressin release might be variable. Uncontrolled diabetic patients should not be examined using spot urine AOR because albuminuria is underestimated due to high urine osmolality brought on by glycosuria.

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References

[1] Lee JH, Kim SY, Lee MJ, Kim SA, Shin SJ, Kim KS: Efficacy of urinary albumin to osmolality ratio in predicting 24-hour urine albumin excretion in type 2 diabetes mellitus patients. *Korean J Nephrol.* 30:601–606, 2011
[2] Morgenstern BZ, Butani L, Wollan P, Wilson DM, Larson TS: Validity of protein–osmolality versus protein–creatinine ratios in the estimation of quantitative proteinuria from random samples of urine in children. *Am J Kidney Dis.* 41:760–766, 2003
[3] Serdaroglu E, Mir S: Protein–osmolality ratio for quantification of proteinuria in children. *Clin Exp Nephrol.* 12:354–357, 2008

In Reply:

Dear Sir,

We thank you for your interest in our work. By examining 73 patients with type 2 diabetes mellitus, we obtained the level of urinary albumin excretion (AER) from 24-hour urine samples and albumin-to-creatinine (ACR) and albumin-to-osmolality concentration ratios (AOR) from spot urine. The data were presented as the means $\pm$ standard deviation, but expression of the medians and ranges might have been preferable because of the variable and large standard deviations of AER and ACR. We concur that some of our data might be skewed.

Another concern was raised regarding patient inclusion. Initially, only patients with proteinuria $\leq$ 500 mg/day were enrolled. However, we later included those with more severe proteinuria because of the small number of patients that were enrolled due to the original inclusion criterion. Even though the patients with proteinuria $\geq$ 500 mg/day were included in this study, we did not think that the main purpose of our study was hampered.

The main purpose of our study was to determine the relationship between spot urine AOR and 24-hour AER in patients with type 2 diabetes mellitus.

In addition, ACR was the focus of this study. Although ACR has been used as an alternative to 24-hour urinary protein excretion, it may have drawbacks. AOR may be better than ACR for detecting and assessing abnormal proteinuria [1], and we demonstrated that both AOR and ACR allow for a reasonable prediction of 24-hour protein excretion. By using area-under-the-curve analysis of the receiver operator characteristic curves, Morgenstern et al [2] also showed that both AOR and ACR are equally accurate for predicting abnormal proteinuria in adults.

To express the relationship between 24-hour urine AER and spot urine ACR and AOR, we used Spearman's correlation. We know that linear regression may be a better alternative statistical method because it is stricter and allows for the presentation of good figures. However, we wanted to present just the correlation, not the cause-and-effect relationship. I think that we reached our goal by using simple correlation analysis and area-under-the-curve analysis of the receiver operator characteristic curves. Thus, we found that AOR is as valid as ACR for determining the 24-hour urine AER in diabetic patients.

The last concern raised was that glycosuria in uncontrolled diabetic patients would be a confounding variable because it increases urine osmolality and falsely underestimates AOR. We also agree that this is possible, at least in part. Sampling urine in the early morning in order to avoid postprandial glycosuria may be useful in order for AOR to predict 24-hour urine AER in children [3]. According to Gyamlani et al [4], however, AOR is closely correlated with 24-hour microalbuminuria determination, and this correlation is not appreciably affected by glycosuria.

Conflict of interest

None to declare.

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References

[1] Wilson DM, Anderson RL: Protein–osmolality ratio for the quantitative assessment of proteinuria from a random urinalysis sample. *Am J Clin Pathol.* 100: 419–424, 1993

[2] Morgenstern BZ, Butani L, Wollan P, Wilson DM, Larson TS: Validity of protein–osmolality versus protein–creatinine ratios in the estimation of quantitative proteinuria from random samples of urine in children. *Am J Kidney Dis.* 41:760–766, 2003

[3] Kim HS, Cheon HW, Choe JH, Yoo KH, Hong YS, Lee JW, Kim SK: Quantification of proteinuria in children using the urinary protein–osmolality ratio. *Pediatr Nephrol.* 16:73–76, 2001

[4] Gyamlani GG, Bergstralh EJ, Slezak JM, Larson TS: Urinary albumin to osmolality ratio predicts 24-hour urine albumin excretion in diabetes mellitus. *Am J Kidney Dis.* 42:685–692, 2003